NORTH CAROLINA
PUBLIC STAFF
UTILITIES COMMISSION

February 18, 2020

Ms. Kimberley A. Campbell, Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4300

Re: Docket No. E-7, Sub 1213 – Application for Approval of Proposed Prepaid Advantage Program; and Docket No. E-7, Sub 1214 – Application for General Rate Case

Dear Ms. Campbell:

In connection with the above-referenced dockets, I transmit herewith for filing on behalf of the Public Staff the public and confidential versions of the testimony and exhibit(s) of Vance F. Moore, President of Garrett and Moore, Inc.

By copy of this letter, I am forwarding a copy of the redacted version to all parties of record by electronic delivery. The confidential version will be provided to those parties that have entered into a confidentiality agreement.

Sincerely,

/s/ Dianna W. Downey
Staff Attorney
dianna.downey@psncuc.nc.gov

DWD/cla

Attachment(s)

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-7, SUB 1213 In the Matter of Application of Duke Energy Carolinas, LLC, for Approval of Proposed Prepaid Advantage Program	)	
DOCKET NO. E-7, SUB 1214 In the Matter of Application of Duke Energy Carolinas, LLC, for Adjustment of Rates and Charges Applicable to Electric Utility Service in North Carolina	)	TESTIMONY OF VANCE F. MOORE ON BEHALF OF THE PUBLIC STAFF – NORTH CAROLINA UTILITIES COMMISSION

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET No. E-7, SUB 1213

DOCKET NO. E-7, SUB 1214

TESTIMONY OF VANCE F. MOORE
ON BEHALF OF THE PUBLIC STAFF
NORTH CAROLINA UTILITIES COMMISSION

FEBRUARY 18, 2020

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND PRESENT POSITION.

A. My name is Vance Moore. My business address is 206 High House Road, Suite 259, Cary, North Carolina. I am the President of Garrett and Moore, Inc.

Q. BRIEFLY STATE YOUR QUALIFICATIONS.

A. I am a registered professional engineer with over 30 years of experience engineering coal ash management projects, including coal ash landfills and impoundments, with services including, but not limited to, facility layout and master planning; ash landfill design, permitting, construction and quality assurance, and closure; ash impoundment closure investigations, closure design and permitting, and closure construction and quality assurance; cost engineering; facility and life of site development and operational cost projections and alternative analyses; ash management facility operations; ash impoundment material recovery and recycling; public meetings and community involvement; environmental monitoring and regulatory compliance, corrective actions, CCR Rule compliance demonstrations, and comprehensive assessments of program and facility environmental liabilities and associated costs. Relevant projects include:

- Canadys Station (Dominion Energy South Carolina, DESC, formerly South Carolina Electric & Gas, SCE&G or SCANA) near Walterboro, South Carolina
    - Ash pond closure
    - Ash landfill development
    - Corrective actions
- Cope Station (DESC) near Cope, South Carolina
    - Ash landfill development
    - Ash landfill wastewater management facility development
    - Ash landfill closure
    - Ash landfill wastewater pond closure
- Cross Station (Santee Cooper) near Pineville, South Carolina
    - Ash Landfill development and closure
- McMeekin Station (DESC) near Columbia, South Carolina
    - Ash pond closure

        - Ash landfill development and closure
        - Ash landfill wastewater pond closure
    - Urquhart Station (DESC) near Beech Island, South Carolina
        - Ash landfill closure
        - Ash pond closure
        - Ash landfill wastewater pond closure
        - Corrective Actions
    - Wateree Station (DESC) near Eastover, South Carolina
        - Ash pond closure
        - Ash landfill development
        - Ash landfill wastewater management facility development
        - Corrective Actions
    - Williams Station (DESC) near Charleston, South Carolina
        - Ash landfill development
        - Ash landfill wastewater management facility development
        - Ash landfill closure
        - Ash landfill wastewater pond closure

Additional qualifications are set forth in Appendix A.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to present to the North Carolina Utilities Commission the results of my investigation into whether the approach to environmental regulatory compliance taken by Duke Energy Carolinas, LLC (DEC), at its Coal Combustion Residuals (CCR) units located at the Allen, Belews Creek, Buck, Cliffside, and Marshall stations in North Carolina was the most prudent and reasonable method of achieving compliance with the laws and regulations governing coal ash management.[1]

Q. WHY DO YOU SAY "PRUDENT AND REASONABLE"?

A. I am not an expert in utility regulation, but have relied upon guidance from the Public Staff attorneys with respect to the legal standard for my investigation. Those attorneys inform me that under N.C. Gen. Stat. § 62-133, a utility's operating expenses must be "reasonable" to be included in the revenue requirement that is the basis for setting rates the utility may charge to consumers. Likewise, the cost of utility property allowed in the rate base, to which an authorized return may be applied, must also be "reasonable." Furthermore, I have been advised that management prudence is one aspect of this statutory reasonableness, and yet some costs or expenses can be prudent but still not reasonable for recovery as a component of the revenue requirement used for setting rates. For purposes of my testimony, I do not attempt to present the legal theory for a distinction between

[1] Due to constraints on time and resources, I did not perform an in-depth investigation of DEC's environmental regulatory compliance actions at its CCR units located at the W.S. Lee Station in South Carolina.

"prudence" and other "reasonableness"; rather, I simply describe the facts that led me to conclude that a particular cost or expense is not reasonable for purposes of rate recovery.

Q. HOW DOES YOUR TESTIMONY DIFFER FROM THAT OF THE OTHER PUBLIC STAFF WITNESSES IN THIS CASE?

A. I understand that Public Staff witnesses Junis and Maness speak to adjustments for environmental violations and the appropriate regulatory accounting treatment for coal ash-related costs. I do not address those issues. The testimony of Public Staff witness Garrett evaluates the prudence and reasonableness of DEC's costs incurred at its two high-priority sites, Dan River and Riverbend. Our testimony together provides a combined perspective on the prudence and reasonableness of the coal ash closure costs for which DEC is seeking cost recovery in this proceeding.

Q. WHAT IS THE SCOPE OF YOUR INVESTIGATION INTO THE PRUDENCE AND REASONABLENESS OF DEC'S COAL ASH MANAGEMENT COSTS?

A. I reviewed the actions and costs incurred by DEC at its Allen, Belews Creek, Buck, Cliffside, and Marshall plants to comply with the Coal Ash Management Act (CAMA),[2] including DEC's actions and costs

[2] 2014 N.C. Sess. Law 122, as amended by 2016 N.C. Sess. Law 95.

incurred in connection with the SEFA STAR ash beneficiation plant at its Buck Station.

Q. PLEASE DESCRIBE THE RESOURCES UTILIZED IN CONDUCTING YOUR INVESTIGATION.

A. In order to prepare this testimony, I reviewed the testimony and work papers of DEC witnesses Bednarcik and Immel. Through the Public Staff, I also submitted extensive discovery to DEC regarding its actions taken at its CCR units and DEC's technical and financial basis for such decisions. I also participated in site visits and conference calls with DEC personnel.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. My testimony first presents my opinion on the prudency and reasonableness of DEC's selected methods for general CCR management at each CCR unit I investigated and the related costs from January 1, 2018, through November 30, 2019. The majority of my testimony focuses on my investigation of the prudency and reasonableness of Duke Energy's approach to compliance with the requirement to beneficiate coal ash imposed by the amendment to CAMA[3] and the associated costs incurred. Based on my investigation, I recommend that the Commission disallow

[3] N.C. Gen. Stat. § 130A-309.216 (2016).

$67,809,160 in costs to construct DEC's Buck beneficiation project that I do not believe were reasonable or prudent.

Q. WHAT IS YOUR OPINION REGARDING THE COSTS DEC SEEKS RECOVERY OF IN THIS RATE CASE FOR ALLEN, BELEWS CREEK, CLIFFSIDE, AND MARSHALL?

A. The North Carolina Department of Environmental Quality (NCDEQ) issued Closure Determinations on April 1, 2019, which mandated that CCR impoundments at DEC's Allen, Belews Creek, Cliffside, and Marshall Stations and Duke Energy Progress, LLC's (DEP), Mayo and Roxboro Stations be excavated. After NCDEQ issued these excavation orders, Duke Energy filed a contested case challenging the orders.

DEC witness Bednarcik states on pages 13 and 14 of her direct testimony:

> With the exception of preliminary closure plan development, none of the site work that has been conducted at [Allen, Belews, Cliffside, and Marshall] is specific to cap-in-place closure. All site work to date would also have to be conducted in an excavation closure. Later in 2019, DE Carolinas anticipates conducting preliminary site evaluations at these four sites, including boring wells, to evaluate potential onsite locations for landfills. This will be done to ensure that the Company will be able to proceed with closure if the NC DEQ Order is upheld.

On December 31, 2019, Duke Energy, NCDEQ, and community and environmental groups entered into a settlement agreement that, among other things, resolved the litigation over the excavation orders. Pursuant to the settlement agreement, Duke Energy will be required to excavate and place in lined landfills a majority of the CCR at DEC's Allen, Belews Creek, Cliffside, and Marshall Stations, and at DEP's Mayo and Roxboro Stations. The direct testimony of Public Staff witness Junis discusses the current regulatory status of closure of DEC's CCR sites in greater detail.

Based on my review of DEC's approach to compliance with NCDEQ requirements, I take no exception to DEC's requested reimbursements for site work performed at Allen, Belews Creek, Cliffside, and Marshall.

Q. PLEASE DESCRIBE DUKE ENERGY'S REQUIREMENT TO BUILD ASH BENEFICIATION PROJECTS THAT WILL PROCESS COAL ASH INTO CEMENTITIOUS PRODUCTS.

A. In 2016, the North Carolina General Assembly amended CAMA. Among other things, the CAMA Amendment added N.C.G.S. § 130A-309.216 regarding ash beneficiation projects. That section requires Duke Energy to process coal ash into a form suitable for use in cementitious products. Part (a) states in part:

> On or before January 1, 2017, an impoundment owner shall (i) identify, at a minimum, impoundments at two sites located within the State with ash stored in the impoundments on that date that is suitable for processing for cementitious purposes and (ii) enter into a binding agreement for the installation and operation of an ash beneficiation project at each site capable of

> annually processing 300,000 tons of ash to specifications appropriate for cementitious products, with all ash processed to be removed from the impoundment(s) located at the sites.

Part (b) requires Duke Energy to identify an additional beneficiation site on or before July 1, 2017, and part (c) sets the closure deadline for intermediate and low-risk impoundments at ash beneficiation sites as no later than December 31, 2029.

Q. PLEASE SUMMARIZE THE ACTIONS DUKE ENERGY TOOK TO COMPLY WITH THE CAMA AMENDMENT'S REQUIREMENT TO SELECT THREE SITES FOR THE CONSTRUCTION AND OPERATION OF BENEFICIATION PROJECTS.

A. In response to a Public Staff data request,[4] DEC stated, "During the Q4 2016 quarterly ARO process, Duke Energy established ash beneficiation site selection criteria based on carbon content, ash inventory volume and product market area associated with the plant location and cost savings comparisons." DEC further stated that "[t]he first two ash beneficiation sites were selected Q4 2016" and "[t]he third site was selected Q2 2017. . . ."

Q. WHAT PLANTS DID DUKE ENERGY CHOOSE FOR THE THREE BENEFICIATION SITES?

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[4] DEC response to Public Staff Data Request No. 202-5 in Docket No. E-7, Sub 1214.

A. Duke Energy chose the DEC Buck plant and the DEP Cape Fear and H. F. Lee plants as the three beneficiation sites. The Buck plant was selected on October 5, 2016.[5]

Q. PLEASE SUMMARIZE THE ACTIONS DUKE ENERGY TOOK TO COMPLY WITH THE CAMA AMENDMENT'S REQUIREMENT TO ENTER INTO AN AGREEMENT FOR THE CONSTRUCTION AND OPERATION OF ASH BENEFICIATION PROJECTS AT THE THREE SITES.

A. On August 11, 2016, Duke Energy Business Services, LLC, as an agent for and on behalf of DEC and DEP (Duke Energy), advertised the Request for Information (RFI) for the Beneficiation of Ponded Ash into Concrete Specification Ash.[6] **[BEGIN CONFIDENTIAL]** [redacted]. **[END CONFIDENTIAL]**

Q. HOW DID DUKE ENERGY EVALUATE THE RFI RESPONSES?

A. **[BEGIN CONFIDENTIAL]** [redacted]

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[5] Page 3 of 12, Exhibit 10, Direct Testimony of DEC Witness Jessica Bednarcik filed in Docket No. E-7, Sub 1214, on September 30, 2019.

Press Release *Available at* https://news.duke-energy.com/releases/duke-energy-to-recycle-coal-ash-at-buck-steam-station-in-salisbury (last visited February 7, 2020).

[6] DEC confidential supplemental response to Public Staff Data Request No. 5-4(e) in Docket No. E-7, Sub 1146.

[redacted]. **[END CONFIDENTIAL]** SEFA calls its beneficiation system Staged Turbulent Air Reactor (STAR).

Q. DID SEFA'S RESPONSE TO THE RFI INCLUDE COST ESTIMATES FOR THE STAR FACILITY?

A. In reference to SEFA's response to the RFI, DEC clarified that the construction estimate for the STAR facility is $64 million including "approximately $14.8M in SEFA engineering and Project Indirect cost, as well as $50.2M for [Engineering, Procurement, and Construction] Direct Construction cost and balance of plant procurement."[8] These estimates are for a single STAR facility. As stated above, the CAMA Amendment requires Duke Energy to install and operate beneficiation projects at three sites.

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[7] DEC confidential supplemental response to Public Staff Data Request No. 5-4(e) in Docket No. E-7, Sub 1146.

[8] DEC response to Public Staff Data Request No. 202-1 in Docket No. E-7, Sub 1214.

Duke Energy's intent was to have SEFA supply the STAR system and provide technical expertise. The remainder of the beneficiation project would be built by a separate contractor.

Q DID SEFA'S RESPONSE TO THE RFI PROPOSE A CONTRACTOR TO CONSTRUCT THE STAR FACILITY?

A. Yes. SEFA's response[9] to the RFI specifically named **[BEGIN CONFIDENTIAL]** [redacted]

[9] DEC confidential response to Public Staff Data Request No. 150-1 in Docket No. E-7, Sub 1214.

[redacted]

[END CONFIDENTIAL]

Q. DID DUKE ENERGY'S CONSTRUCTION ESTIMATES FOR THE STAR FACILITY INCREASE AFTER SEFA'S RESPONSE TO THE RFI?

A. Yes. Duke Energy's December 31, 2017, ARO cost spreadsheet,[10] **[BEGIN CONFIDENTIAL]** [redacted]

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[10] DEC confidential supplemental response to Public Staff Data Request No. 5-19 in Docket No. E-7, Sub 1146.

[11] DEC confidential response to Public Staff Data Request No. 150-3 in Docket No. E-7, Sub 1214.

[12] **[BEGIN CONFIDENTIAL]** [redacted] **[END CONFIDENTIAL]**

[redacted].

[END CONFIDENTIAL]

As stated above, SEFA's response to the RFI includes approximately $14.8 million in SEFA engineering and Project Indirect cost. **[BEGIN CONFIDENTIAL]** [redacted]. **[END CONFIDENTIAL]**

Q. DID DUKE ENERGY CONTRACT WITH H&M TO CONSTRUCT THE BENEFICIATION UNIT AT BUCK?

[13] DEC confidential response to Public Staff Data Request No. 183-5 in Docket No. E-7, Sub 1214.

[14] DEC response to Public Staff Data Request No. 202-1 in Docket No. E-7, Sub 1214.

A. No. In response to a Public Staff data request, DEC indicated that **[BEGIN CONFIDENTIAL]** [redacted]

[redacted].

[END CONFIDENTIAL]

Q. PLEASE DESCRIBE DUKE ENERGY'S PROCESS TO SELECT A CONTRACTOR TO CONSTRUCT THE BENEFICIATION UNITS.

A. For the engineering, procurement, and construction of the three beneficiation units, Duke Energy advertised a request for proposals (RFP) dated **[BEGIN CONFIDENTIAL]** [redacted]

[15] DEC confidential response to Public Staff Data Request No. 183-3 in Docket No. E-7, Sub 1214.

DEC response to Public Staff Data Request No. 202-6 in Docket No. E-7, Sub 1214.

[16] DEC confidential response to Public Staff Data Request No. 183-4 in Docket No. E-7, Sub 1214.

[redacted]. **[END CONFIDENTIAL]** A summary table of the change order descriptions and cost impacts to the project is provided as **Confidential Moore Exhibit 5**.[17]

Q. **DID THE DESIGN AND SCOPE OF WORK FOR THE CONSTRUCTION OF THE BENEFICIATION UNITS CHANGE BETWEEN THE TIME OF SEFA'S RESPONSE TO THE RFI AND DUKE ENERGY'S AWARD OF THE CONSTRUCTION CONTRACT TO ZACHRY?**

A. I was not able to determine whether there were any design modifications that would account for the increase in construction costs between the H&M estimate and the Zachry estimate. However, Duke Energy's Adjustments to Construction Base Estimate

[17] DEC confidential response to Public Staff Data Request No. 150-14 in Docket No. E-7, Sub 1214.

increased substantially in October 2017. **[BEGIN CONFIDENTIAL]** [redacted]

[redacted]

[18] DEC confidential response to Public Staff Data Request No. 202-7 in Docket No. E-7, Sub 1214.

[redacted]. **[END CONFIDENTIAL]** See **Confidential Moore Exhibit 6**.

Q. BASED ON YOUR ANALYSIS, WHAT HAS BEEN THE MOST SIGNIFICANT SOURCE OF COST INCREASES FOR THE BUCK BENEFICIATION PROJECT?

A. The most significant source of cost increases has been the increased construction costs, which applies to all the beneficiation units. **[BEGIN CONFIDENTIAL]** [redacted]. **[END CONFIDENTIAL]**

Duke Energy selected SEFA for Engineering, Procurement, Start-Up and Commissioning with an initial contract for **[BEGIN CONFIDENTIAL]** [redacted] **[END CONFIDENTIAL]**, which has increased to **[BEGIN CONFIDENTIAL]** [redacted]. **[END CONFIDENTIAL]**

Duke Energy selected Zachry with an initial contract amount of **[BEGIN CONFIDENTIAL]** [redacted] **[END CONFIDENTIAL]** which has increased to **[BEGIN CONFIDENTIAL]** [redacted]

[redacted] **[END CONFIDENTIAL]** as stated above.

Q. DO YOU BELIEVE DUKE ENERGY'S DECISION TO AWARD THE ENGINEERING CONTRACT TO SEFA WAS REASONABLE AND PRUDENT?

A. Yes, in recognition of the Commission's guidance in its Order Accepting Stipulation, Deciding Contested Issues, and Requiring Revenue Reduction in the E-7, Sub 1146, proceeding. In the Order, the Commission concluded that "the most reasonable reading of N.C. Gen. Stat. § 130A-309-216 indicates that the General Assembly intended that Duke Energy install and operate technology, such as carbon burn-out plants and STAR technology . . . ." Technologies available to process ponded ash to specifications appropriate for a replacement for Portland cement for ready mix concrete are limited. SEFA was the only responder to Duke's "Request for Information (RFI) for the Beneficiation of Ponded Ash into Concrete Specification Ash" dated August 11, 2016, that had demonstrated the ability to process ponded ash to specifications appropriate for a replacement for Portland cement.

Q. DO YOU BELIEVE THE CHANGE ORDERS TO THE ENGINEERING CONTRACT WITH SEFA WERE REASONABLE AND PRUDENT?

A. Yes. Based on my review, I believe the change orders and the associated costs were reasonable and prudent given the circumstances.

Q. DO YOU BELIEVE DUKE ENERGY'S DECISION TO AWARD THE CONSTRUCTION CONTRACT TO ZACHRY FOR THE AMOUNT CONTRACTED WAS REASONABLE AND PRUDENT?

A. No. H&M had constructed similar facilities designed by SEFA and **[BEGIN CONFIDENTIAL]** [redacted]. **[END CONFIDENTIAL]** Readily available articles state that capital costs for SEFA's beneficiation unit at Winyah Station in South Carolina, which is capable of processing similar quantities of ponded ash, were approximately $40 million**.** See **Moore Exhibit 7.**

Duke Energy's selection of Zachry to construct the beneficiation unit at the Buck Station more than doubled the construction cost when compared to the combination of H&M's cost estimate plus Duke Energy's adjustment. Therefore, I do not believe Duke Energy's selection of Zachry to construct the beneficiation unit at the Buck Station for the amount contracted was reasonable and prudent.

Q. WHAT SHOULD DUKE ENERGY HAVE DONE DIFFERENTLY TO KEEP COSTS WITHIN THE INITIAL PROJECTED AMOUNT?

A. When Duke Energy received the construction estimate from Zachry and learned that the estimated cost for the STAR facilities would be far higher than originally estimated, it should have attempted to mitigate the costs. The following are examples of options Duke Energy could have pursued:

1) Upon receiving the estimate from Zachry (which was more than double the H&M estimate), Duke should have sent the construction contract out for bid again to a broader group of companies.

2) Instead of contracting with a single company to construct all three STAR facilities, Duke Energy could have entered into three separate contracts for the construction of one STAR facility each. Because the scope of each individual project would be less, this would have almost certainly expanded the pool of bidders **[BEGIN CONFIDENTIAL]** [redacted]. **[END CONFIDENTIAL]** Duke Energy could have further divided the

construction of each STAR facility into separate contracts for the various components of each facility.

3) Before entering into the construction contract with Zachry for more than double the amount of the H&M estimate, Duke Energy should have sought statutory relief from the CAMA Amendment's beneficiation requirements from the General Assembly. I have been informed that such a statutory relief option exists in the context of the Renewable Energy and Energy Efficiency Portfolio Standard in NC. Gen. Stat. § 62-133.8(i)(2), and that DEC and other electric power suppliers have utilized this option multiple times to seek delays in certain requirements related to swine and poultry waste set-asides upon a showing to the Commission that the electric power suppliers made a reasonable effort to meet the requirements, and it was in the public interest to grant the delay or modification.

4) Upon receiving the estimate from Zachry and learning that the estimated cost of the beneficiation projects would be far higher than originally estimated, Duke Energy should have sought guidance from the regulator, NCDEQ, as to whether some waiver or compromise would be possible, and what the consequences would be if it did not comply with the beneficiation requirements of the CAMA Amendment.

Q. DO YOU BELIEVE THE CHANGE ORDERS TO THE CONSTRUCTION CONTRACT WITH ZACHRY WERE REASONABLE AND PRUDENT?

A. Yes. Based on my review, I believe the change orders and the associated costs were reasonable and prudent given the circumstances.

Q. PLEASE SUMMARIZE THE FOUR COST ESTIMATES DESCRIBED IN YOUR TESTIMONY.

A. The following table summarizes the cost estimates to construct the beneficiation unit at the Buck Station described in my testimony:

Table 1 (In Millions) **[BEGIN CONFIDENTIAL]**

[redacted]

[END CONFIDENTIAL]

[19] See **Confidential Moore Exhibit 6**.

Q. WHAT IS YOUR OPINION REGARDING WHETHER DEC'S CUSTOMERS SHOULD BE REQUIRED TO PAY FOR COSTS ASSOCIATED WITH CONSTRUCTION OF THE BENEFICIATION UNIT AT THE BUCK STATION?

A. I recommend that the Commission disallow $67,809,160 of the construction costs. The disallowance amount is the difference between Duke Energy's reasonable expectation of **[BEGIN CONFIDENTIAL]** [redacted] **[END CONFIDENTIAL]**, which is the sum of H&M's cost estimate of **[BEGIN CONFIDENTIAL]** [redacted] **[END CONFIDENTIAL]**, and Zachry's initial total contract amount of **[BEGIN CONFIDENTIAL]** [redacted]. **[END CONFIDENTIAL]**

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

Qualifications of Garrett and Moore, Inc.

Garrett and Moore, Inc., specializes in engineering services for power and waste industries. We remain focused and specialized in these markets and are dedicated to continuing to advance the reputation of excellence our staff has established through the years. Our company has been responsible for the construction administration and Construction Quality Assurance for about $90 million worth of lined landfill, final cover system, and lined wastewater pond construction since 2007, with much of that work specific to CCR landfills and ash basins. We have familiarity with the federal CCR Rule and the North Carolina Coal Ash Management Act, and have tremendous experience with CCR disposal methods and their associated costs.

Vance Moore and Bernie Garrett have specialized expertise in the following areas:

Coal Combustion Residuals

Through our firm of Garrett and Moore, Inc., we have provided engineering and consulting services to support power companies in the management of coal combustion residuals (CCRs), including but not limited to the following:

- Groundwater Monitoring
- Groundwater Corrective Action
- Hydrogeological Investigations
- Site Characterization Studies
- Geotechnical Evaluations
- Stability and Liquefaction Analysis
- Ash Pond Closure Design
- FIN 47 Cost Liability Estimating
- Ash Pond Closure Construction
- Ash Pond to Landfill Conversion
- Source Remediation
- Dewatering Design
- Ash Landfill Siting & Design
- Ash Landfill Construction
- Landfill Closure & Post-Closure Guidance
- Federal CCR & CAMA Rule
- Regulatory Compliance
- Environmental / Permit Audits

Solid Waste Engineering

Through our firm of Garrett and Moore, Inc., we have provided full-service solid waste design and permitting services for municipal solid waste (MSW), construction and demolition debris (C&D), land clearing and inert debris (LCID), industrial waste, tire monofills, and coal combustion ash landfills. We have a very successful track record of overseeing landfill development projects from concept to operations. Our expertise in solid waste engineering includes the following:

- Facility Siting Studies
- USEPA HELP Modeling Analysis
- Settlement and Bearing Capacity Design
- Alternative Liner Analysis
- Stormwater Management & Design
- Equivalency Determinations
- Recyclables Program Management
- Landfill Closure & Post-Closure
- Convenience Center Planning / Design
- Waste Treatment & Processing
- Landfill Gas Remediation Plans
- Engineering Design
- Slope Stability & Liquefaction
- Leachate Management System
- Landfill Gas Planning and Design
- Operations Planning
- Life of Site Analysis
- Alternate Final Cover Evaluations
- Transfer Stations
- Compost Systems
- Special Waste Permitting
- Operations & Maintenance

Bernie Garrett and Vance Moore have been providing engineering services for CCR management projects continuously since 1995. Over the last 10 years, we have performed all engineering associated with CCR management projects at all six of SCE&G's coal fired power plants, as well as facilities owned and operated by Santee Cooper. Our credentials include the following:

■ **Vance F. Moore, P.E**

Mr. Moore is a principal and founding member of Garrett & Moore.
Mr. Moore has over 30 years of experience providing environmental engineering and consulting services to the power and waste industries. He has provided design, permitting, construction quality assurance, and operations support for numerous RCRA Subtitle D landfill projects, ash landfill projects, ash landfill closure projects, and ash pond closures in North and South Carolina.
Registrations: Professional Engineer – Georgia, North Carolina, South Carolina
Education: B.S., Civil Engineering, North Carolina State University, 1989
Associations: North Carolina SWANA Chapter - Technical Committee.
South Carolina SWANA Chapter

■ **Bernie Garrett, P.E.**

Mr. Garrett is a principal and founding member of Garrett & Moore.
Mr. Garrett has over 30 years of experience providing environmental engineering and consulting services to the power and waste industries. His experience and professional responsibilities have progressed from project engineer with a major national engineering firm, project manager on solid waste landfill projects with a regional engineering firm, to client/project manager responsible for comprehensive engineering and consulting at Garrett & Moore, Inc.
Mr. Garrett has been working on coal ash management projects continuously since 1999. He has provided design, permitting, and construction quality assurance and operations support for ash pond closures, ash landfill projects, and ash landfill closure projects.

Registrations: Professional Engineer - Georgia, North Carolina, South Carolina, Virginia.
Education: B.S. Civil Engineering, Virginia Tech (1989);
M.S. Environmental Engineering, Old Dominion University (1996)
Associations: PENC Central Carolina Chapter Board of Directors

ACEC/PENC Solid and Hazardous Waste Subcommittee

Public Staff
Confidential Moore Exhibit 1

Docket No. E-7, Sub 1214

CONFIDENTIAL

Public Staff
Confidential Moore Exhibit 2

Docket No. E-7, Sub 1214

CONFIDENTIAL

Public Staff
Confidential Moore Exhibit 3

Docket No. E-7, Sub 1214

CONFIDENTIAL

Public Staff
Confidential Moore Exhibit 4

Docket No. E-7, Sub 1214

CONFIDENTIAL

Public Staff
Confidential Moore Exhibit 5

Docket No. E-7, Sub 1214

CONFIDENTIAL

Public Staff
Confidential Moore Exhibit 6

Docket No. E-7, Sub 1214

CONFIDENTIAL

Public Staff
Moore Exhibit 7

SEFA Building Fly Ash Recycling Plant

Allan Gerlat | Dec 03, 2013

SEFA Group Inc. will build a $40 million facility to recycle high-carbon fly ash in Georgetown, S.C.

The Lexington, S.C.-based SEFA, formerly the Southeastern Fly Ash Co., said in a news release the facility will use all of the fly ash produced at Santee

Cooper's Winyah Generating Station, using a new recycling technology.

The facility also will recycle fly ash previously in ash ponds located at Winyah Station. Coal fly ash from other Santee Cooper electric generating stations also may be transported to the Winyah Station site for processing.

The new facility can recycle up to 400,000 tons of fly ash per year. SEFA will use the fly ash from the Winyah Station as a primary ingredient in its proprietary STAR (Staged Turbulent Air Reactor) process to produce a pure mineral product, free of organic contaminants.

The recycling plant's primary product will be a supplementary cementitious material that is trademarked as STAR RP.

Source URL: https://www.waste360.com/construction/sefa-building-fly-ash-recycling-plant

SEFA Group to Build Fly Ash Recycling Plant in South Carolina

Fly ash firm is working with large South Carolina power company to take in fly ash from ponds.

SUBSCRIBE

November 22, 2013

CDR Staff

C&D

The SEFA Group, headquartered in Lexington, S.C., has announced plans to build a $40 million facility to recycle high carbon fly ash produced by the power company Santee Cooper at its Winyah generating station in Georgetown, S.C. SEFA also will take in coal fly ash from other Santee Cooper electric generating stations, where the material will be processed into a marketable product.

Santee Copper is South Carolina's state-owned electric and water utility that came into being during the New Deal.

The new facility is expected to recycle up to 400,000 tons of fly ash per year. SEFA will use the material as a primary ingredient for its STAR (staged turbulent air reactor) process to produce a pure mineral product, free of organic contaminants.

SEFA presently has two other STAR plants, one in Columbia, S.C., the other in Newburg, Md. The new facility will be the first to recycle fly ash from settling basins.

Tom Hendrix, CEO of the SEFA Group, says,"We introduced STAR RP to the concrete industry in 2011 when we began operating our Maryland plant. The pure mineral matter produced by our STAR plants provides greater strength and durability in concrete than the fly ashes that were typically used to make concrete over the last several decades."

Santee Cooper says it has recycled fly ash, bottom ash and gypsum since the 1970s. Prior to the recent recession, Santee Cooper was using about 90 percent of the material for beneficial purposes. The utility's ash is used by the cement and concrete block industries.

Santee Cooper notes that it has worked to recycle as much of its ash as possible through the decades. The challenges now are that with EPA (Environmental Protection Agency) regulations spurring the closure of coal-fired generating stations around the country, there has become greater demand for ash and the development of new technology that increases the viability of pond ash

"As we continue working to close units at Jefferies and Grainger and consider long-term needs for Winyah, Santee Cooper is focused on solutions that are cost effective and beneficial to the environment and the economy," says R M Singletary, executive vice president of corporate services. "This is a triple win. It is cost effective, which means it is responsive to our customers' best interests. It utilizes innovative technology to help an important South Carolina industry be sustainable And it is an EPA approved use of ash "

"This plan also addresses comments by our neighbors, the city of Conway and the South Carolina Department of Health and Environmental Controls about long term placement of the ash, and it does so in a manner that is responsible to customers," Singletary adds. "It's a solution that really does have something favorable for all involved "

The plans will empty Santee Cooper's ash ponds at the three stations over the next 10 to 15 years. The power company will provide excavation, loading and transportation of the ash to the plants where it will be used

The SEFA Group is diversified throughout many areas of fly ash use for the construction industry.

A NEW SOLUTION FOR A LONG-STANDING DILEMMA

"The cost of disposing of coal ash just went up. Again."

By Jimmy C. Knowles and Bill Fedorka

While the utility industry has become accustomed to hearing this familiar phrase over the last several decades, previous increases in ash disposal cost are expected to pale in comparison to increases coming after October 14, 2015. On that date, the requirements of the U.S. Environmental Protection Agency's (EPA's) final rule regulating new and existing coal ash landfills and ponds will go into effect. These new requirements are nearly identical—and just as costly—as those for municipal solid waste landfills.

What about the millions of tons of coal ash previously disposed of in unlined ponds? According to the EPA, many of these impoundments will need to be closed and the ash either covered or removed.

Fortunately, the EPA has provided a path to avoid high disposal costs and the long-term risks associated with the new requirements. The solution: "encapsulated beneficial use." This approach is consistent with what the industry has been doing for years: using ash as a performance-enhancing additive in concrete and other composites. Consequently, utilities have an even greater incentive to see that coal ash goes to beneficial uses such as concrete—namely, reducing their disposal costs and improving environmental stewardship.

From the perspective of a commercial customer for coal ash, the decision to use ash has become more difficult. Every year there is less fly ash being produced and the quality of that fly ash is deteriorating. In some markets, fly ash beneficiation has helped improve the quality, thereby increasing the supply. And yet, even markets with access to quality product lacked the year-round availability of fly ash necessary to keep up with the seasonal fluctuations.

Coincidentally, hundreds of millions of tons of previously disposed coal ash were sitting idly in ponds all over the country. The industry was in need of a beneficiation technology that could not only process poor-quality fly ash into a high-quality additive for concrete but also transform previously disposed coal ash, such as pond ash, into a quality product for encapsulated beneficial use.

ENTER STAR

The technology, known as staged turbulent air reactor (STAR), was first commercialized in 2008 and the latest facility came online early 2015 at Santee Cooper's Winyah Generating Station (WGS). The Winyah STAR Plant processes fly ash as it is produced at WGS. More importantly, however, it also processes coal ash that was produced decades ago as it is reclaimed from on-site ash ponds.

For years, The SEFA Group has been a long-term service provider to Santee Cooper—initially for ash marketing and more recently for ash beneficiation and marketing. When Santee Cooper was faced with the task of cleaning out and removing millions of tons of coal ash from several of their ponds, they turned to SEFA for help. In 2013, SEFA first successfully demonstrated commercial-scale beneficiation of pond ash at its McMeekin STAR Plant. The following year, SEFA decommissioned its currently existing carbon burnout beneficiation plant at WGS and replaced it with the next-generation STAR plant that could interchangeably beneficiate both freshly produced fly ash and previously disposed coal ash reclaimed from ponds.

Santee Cooper required an extremely flexible coal ash beneficiation technology. Each day, the Winyah STAR Plant adjusts to a wide range of coal ash from varied sources. For example, the Winyah STAR Plant routinely operates using only reclaimed coal ash from ponds and yet is able to switch its feed source at a moment's notice to process 100% dry fly ash as the WGS comes online.

The Winyah STAR Plant routinely processes coal ash with residual carbon contents ranging from 5% to over 25%. Because the plant is a stand-alone solution, it does not depend on WGS in any way and operates normally, even when all the WGS units are offline. In fact, even if any or all of the WGS units are decommissioned in the future, the plant could continue operating at full capacity for decades, limited only to processing the on-site pond ash.

Uninterrupted supply and consistent quality translate to increased demand for fly ash. Customers lose confidence in fly ash when they cannot rely on it being available when needed or if the quality of the fly ash causes problems with their production and processes. The Winyah STAR Plant allows Santee Cooper to maximize the annual amount of coal ash used from WGS by providing a continuous supply of quality product to its customer base.

Unless reclaimed pond ash is used at Winyah to augment feed material, the supply of STAR fly ash would never keep up with demand. Like most coal-fired power plants, the recent trend at WGS has been for less coal to be burned, especially during the spring and fall months when customer demand for fly ash is at its highest. Reclaimed coal ash from ponds provides continuous feed material for the Winyah STAR Plant and ensures uninterrupted supply for customers. For power plants, that offers the benefit of elimination or reduction in disposal costs and tangibly demonstrates its long-term commitment to environmental stewardship.

CONSISTENT QUALITY WITH CONTINUOUS PERFORMANCE

The enhanced quality of STAR fly ash is a critical element of its compelling value proposition. Typical by-product fly ash will have varying amounts of unburned carbon, which negatively affects the quality of products made from it, and which subsequently increases both the need and cost of the customers' quality control. Regardless of the carbon content of the source feed, STAR fly ash has little to no carbon remaining and therefore the presence of STAR fly ash does not negatively affect the customers' quality control practices in any way. The quality characteristics of Winyah STAR fly ash remain constant, regardless of whether it is produced from reclaimed pond ash or from fly ash produced by the WGS plant.

Of course, many of the other characteristics of STAR fly ash are changed for the better. For example, STAR processing improves the early strength and ultimate strength gain of any fly ash used in concrete, primarily by increasing the fineness of the fly ash. In the case of pond ash, due to prolonged exposure to water, the ash does not have the strength activity necessary to be marketed as specification-grade fly ash unless it is calcined at the high operating temperatures of a STAR plant.

STAR processing also removes additional contaminants from fly ash including, for example, ammonia, which would otherwise be a nuisance or represent a quality control problem for customers. Consequently, Santee Cooper is supporting research to develop diversified markets for Winyah STAR fly ash as additives in coatings, plastics, rubber, and other products.

LONG-TERM COST IMPLICATIONS

The landfill industry is highly regulated and more stringent environmental regulations have made it more costly to own and operate landfills. Significant amounts of capital are necessary to permit, construct, operate, and monitor sites. New coal combustion residuals (CCR) regulations are intended to mirror nonhazardous municipal solid waste (MSW) landfill rules and standards (RCRA Subtitle D). As a consequence, it has been projected to cost more than $1 million per acre to permit, construct, operate, close, and monitor a landfill in compliance with the new regulations. Permits will require 30 years of environmental monitoring after a landfill closes. It should go without saying that a financial commitment of this magnitude needs to be evaluated and planned well in advance.[1]

In June 2014, the EPA published an economic impact analysis (EIA) for MSW landfills to study the impact of proposed amendments to the Standards of Performance. Figure 1 illustrates one finding from the EIA with respect to MSW landfill cost increases. As discussed previously, the new CCR regulations mirror for the most part those for MSW landfills because both are controlled under RCRA Subtitle D. The EIA presents a model originally published in 2005 to help estimate costs[2] for a hypothetical landfill based on known market conditions and cost data.

EVALUATING THE BENEFITS IN MORE WAYS THAN ONE

A cost analysis comparing two options—1) The "do-nothing," or 100% landfilled options; versus 2) investment in STAR and removing material offsite through sales of thermal beneficiated ash—helps to demonstrate the potential cost difference.

1 The cost to dispose of MSW at a landfill is commonly known as a "tip fee" or "gate fee." In September 2012, the average national spot market price to dispose of one ton of waste in a U.S. landfill was roughly $45, up 3.5% over 2011. This compares to average national tip fees of approximately $32 in 1998 and $8 in 1985. Between 1985 and 1995, the national average tip fee increased by 293%. In the subsequent 10-year period, the national average tip fee increased by 7% per year.

2 Landfill costs fall into the following categories: site development, construction, equipment purchases, operation, closure, and post-closure. Site development includes site surveys, engineering and design studies, and permitting fees. Construction costs encompass building the landfill cells as well as development of permanent on-site structures needed to operate the landfill. Evacuation of the landfill site comprises a notable portion of the construction costs. Installation of a liner can also vary greatly in cost depending on the site's geology. Operating costs are relatively small when compared to the capital costs and include staffing, equipment, leachate treatment, facilities, and general maintenance.

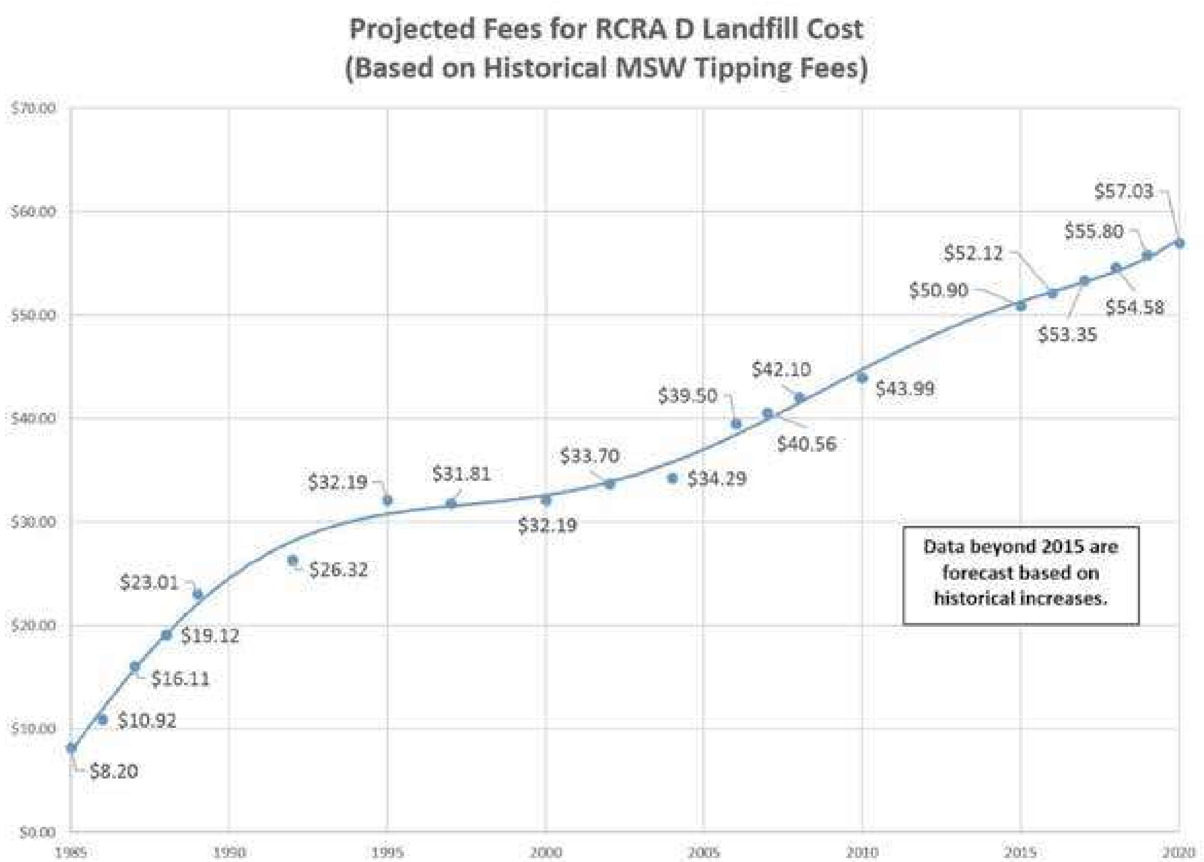

Fig. 1

To estimate the net present value (NPV) of a new landfill development project for CCRs, it was assumed that the site development costs, which include all engineering and permitting, would total a fixed $1 million.[3] The calculated operating factors and cost assumptions can be seen in Fig. 2.

For the "do-nothing" option, five 33-acre cells would need to be developed over the 20-year period to handle the 7.9 yd^3 of fly ash disposal. The NPV of all costs was determined to be $84 million dollars assuming a 7% discount rate and inflation of 2.5%. This represents an equivalent, "all-in" disposal cost of $20.82 per ton average over the 20-year period. The cost per acre, in today's dollars, would be approximately $985,000 per acre (see Fig. 3).

If nearly 6.5 million tons of ash were disposed of on site, the utility or landfill owner still has to deal with the 30-year post-closure period and all its associated costs, not to mention the perpetual liability of all that material buried underground.

Even if only 85% of the available fly ash could be beneficiated and taken offsite, only one cell would need to be developed with a life of nearly 40 years. Beneficiation would eliminate the liability and 30-year post-closure costs on 5.5 million tons of fly ash. At the end of the 20-year period, the beneficiation facility would be paid for, with plenty of years of productivity ahead as life extension costs are paid through the operation and management of the facility. Even if the power plant went dark or was mothballed, the STAR could still reclaim material from disposal sites, using it as raw feed.

For the 85% beneficiation option, the NPV of disposal costs would reduce to less than $19 million. Assuming a capital cost for a STAR facility in the $50 million range, the total investment for the beneficiation plus disposal option would be $69 million ($19 million disposal NPV plus $50 million beneficiation investment). This represents a savings of $15 million in today's dollars.

In addition, the beneficiation option would avoid disposal of 6.7 million yd^3 of material, and avoid all post-closure landfill costs, which, according to new regulations, will extend 30 years after closure. The sales of ash from the beneficiation facility would cover all operations and maintenance associated with the beneficiation facility and includes capital for life extension that will allow the plant to operate well past the 20-year period included in the analysis. In addition to the financial advantages, using STAR technology enhances public sentiment because of its broad environmental benefits and the opportunity to be a proactive industry leader.

SUMMING UP

Ultimately, each utility tailors its coal ash management program to its specific circumstances and there will not be a single magic bullet that will solve all of its problems. More likely, each utility will address its unique issues using a combination of several different ash management practices. Even so, it will be increasingly difficult to avoid the skyrocketing cost of ash disposal unless ash can be diverted from disposal to beneficial use. Fortunately, there is now a tool available:

3 An average value of $423,000 (adjusted from $350,000 in 2005 dollars) per acre was used for the landfill construction costs in accordance with the Duffy model. Likewise, the costs for installation of a cap and post-closure care were estimated to be $80,000 and $50,100 per acre, respectively.

SITE DEVELOPMENT OPERATING FACTORS AND COSTS FOR "DO NOTHING" OPTION

Operating Factors
1500MW / 75% Capacity Factor
9600 Btu/kWhr / Bituminous Coal
12,500 Btu/lb. Heat Factor
10% Ash content / 85% Fly Ash
321,667 Fly Ash Tons Per Year
23% Moisture - Conditioned Ash
1 Yd. Conditioned ash = 1 Ton

Operating Cost Assumptions
33 Acres Per Cell
60 Feet Maximum Height of Cell
3:1 Angle of Exterior Slope
$2.00 per ton hauling cost
$3.50 per ton to place/compact
$100,000 per year (misc. cost)

Fig. 2

the staged turbulent air reactor (STAR). STAR has the technical flexibility to continue to transform coal ash from both current operations and existing landfills and ponds into a consistent, high-quality product that can be sold as a value-added product for encapsulated use. This technology prevents coal ash from becoming or continuing to be a liability and expense as a landfill or pond waste product. ❖

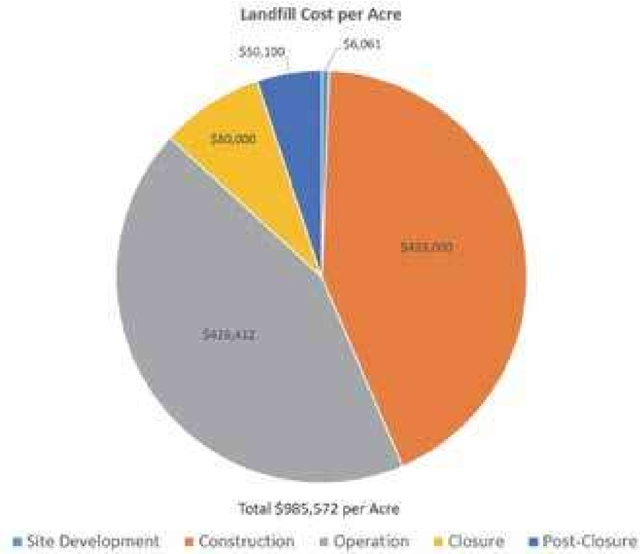

Fig. 3

Jimmy C. Knowles, Vice President of Market Development and Research, joined The SEFA Group over 30 years ago and has served in a variety of positions with the company.

Bill Fedorka, Director of Engineering for The SEFA Group, is a Design and Project Engineer with over 20 years of experience in feasibility evaluation, process and mechanical design, project management, installation, start-up, and operations/maintenance for an extensive range of mechanical equipment and systems.

NEWS

How North Carolina law could make it harder to recycle coal ash

Rhiannon Fionn | November 7, 2016

Max / Creative Commons (https://www.flickr.com/photos/iceage366/2686572211)
The use of recycled coal ash in concrete can cut down on more emissions-intensive Portland cement.

Deadlines in North Carolina's coal ash law have some worried that Duke Energy may choose recycling options that could leave prospective concrete customers unsatisfied and much of its coal ash inventory in wet impoundments.

Henry Batten, president of Concrete Supply Co. in Charlotte, says he is committed to buying Duke Energy's recycled coal ash even though he says it will cost him more than purchasing imported Asian ash. However, because of state law, he questions whether Duke Energy can choose to build the type of reprocessing plant that produces ash that, he says, "is 100 percent consumable by us without question; in fact, I would take it all day, every day if I could get it."

Citing geopolitical concerns, he says having a regional source of coal ash that meets international and state specifications for concrete is critical for his company. But his preferred process for beneficiation – optimizing the ash for use in concrete is the most expensive, and Coal Ash Management Act (CAMA) deadlines don't seem to leave room for facilities with long enough lifespans to justify the investment.

Between its North and South Carolina operations, Batten reports that his company "consumes about 2.1 to 2.5 million tons of ash annually," adding, "I'm probably the largest consumer of ash in the Carolinas, and I made a commitment that I would buy that ash because I need a reliable source."

Batten made his comments during a presentation to the Alliance of Carolinians Together (ACT) Against Coal Ash (http://actagainstcoalash.nccoalash.org/) group.

"We feel like the better informed we are, the better we can make decisions, and the better we can advocate for those people who will be most affected," says, Caroline Armijo, a member of ACT, who says she never imaged herself advocating for the concrete industry.

Duke's options

North Carolina law requires Duke Energy to create three beneficiation plants capable of annually producing 300,000 tons of ash "to specifications appropriate for cementitious products" from wet waste impoundments

The law also requires the company to announce siting for two of the three plants by Jan 1, 2017, and a third by July 1, 2017 In October, as part of a lawsuit settlement, Duke identified its Buck plant (https://news.duke-energy.com/releases/duke-energy-to-recycle-coal-ash-at-buck-steam-station-in-salisbury) , in Salisbury, North Carolina, as one of the three sites.

The company could go with one or more of multiple options at the two additional plants, and those options could be provided by different vendors; the technology used at each plant could vary since the technology selected must be site-specific.

The associated costs range from less than $5 million for dry ash handling only to more than $50 million for thermal beneficiation that can process both wet and dry ash. It's the latter that produces the quality of ash Batten wants for his concrete company.

A market study (http://energynews.us/2016/09/14/report-outlines-challenges-to-recycling-north-carolina-coal-ash/) , to be presented to the North Carolina Environmental Management Commission on Nov 9, states, "To our knowledge, the only large scale commercial operation in the U.S. that is currently processing wet ash is the SEFA STAR process."

Another company, PMI Ash Technologies, based in Raleigh, is listed as a thermal beneficiation company for dry ash using its Carbon Burn Out (http://www.pmiash.com/carbonburnout.asp) process, but CEO Lisa Cooper says her company is also qualified to handle wet ash

Both she and Jimmy Knowles, Vice President of Market Development and Research at The SEFA Group, headquartered in Lexington, South Carolina, say that the $50 million price tag represents the high end of the price range for thermal facilities at large coal-fired plants, but that it's not an unreasonable estimate.

"The cited all-in cost above would be for a large plant, probably with a maximum feed rate approaching 500,000 tons per year," says Knowles. "The design for an ash beneficiation plant at any of the Duke Energy sites in N C would probably be similar in size."

Cooper says the price estimate likely includes storage, an important consideration during winter months when there is less construction activity. She says storage costs could be mitigated through agreements with ash marketers.

A site's location could also drive beneficiation costs up. "We have a nice plant in Georgetown, South Carolina," says Knowles, "but between the seismic zone it's in and hurricane issues, there were all kinds of additional costs that were built into it that increased the costs."

Duke Energy could also save by mixing and matching its options, installing the more expensive, but smaller-scale, thermal option along with less expensive dry-ash processors, enabling its ability to upgrade or expand its ash processing in the future in response to market conditions.

The company has only begun the process of requesting information from the companies and declined to comment on vendor-related matters.

Duke could be competitive on coal ash

The market study (http://energynews.us/2016/09/14/report-outlines-challenges-to-recycling-north-carolina-coal-ash/) , produced by Electric Power Research Institute (EPRI), the University of Kentucky Center for Applied Energy Research and Golder Associates, indicates that Duke Energy is well positioned to turn coal ash into a revenue stream with its "competitive advantage" in North Carolina. The study also noted that Duke might be competitive in several other states as well and that annual demand for coal ash is increasing

In fact, demand is so high that Batten says the controversial "cap-in-place" closure method isn't a deterrent Capping an impoundment, however, would add to closure expenses.

"We would hope that every plant that ever gets capped would eventually allow us, or someone like us, to harvest that ash for reuse in concrete because it's better – it's a more sustainable option than leaving it in the impoundments," says Batten.

"We are exploring how cap-in-place designs can be used to allow for potential coal ash recycling," says Duke Energy spokesperson Zenica Chatman, adding that in Florida the company is harvesting previously capped ash to meet market demand there.

North Carolina ratepayers could pay for the beneficiation plants, but they could also benefit from them.

Currently, according to Chatman, "The company does not profit from ash sales in North Carolina. If we have a profit in the net sale of ash byproducts, North Carolina customers get the benefit. If we have a net loss, the company may recover the losses through the fuel clause."

Deadlines not beneficial

According to the study, "Beneficiation will be most attractive at those facilities that will eventually require excavation of the ponded ash, do not have an alternative use (e g clay mine fill), and have a minimum 15 to 20 year period to evaluate, design, construct, and operate a beneficiation facility."

Deadlines were mentioned as an impediment, however, though the 2016 law allows (https://www.documentcloud.org/documents/2922623-H630-CSRI-32-v2-NEW-Coal-Ash-Bill-June-2016.html) the secretary of the Department of Environmental Quality to extend the deadlines.

Currently, the deadline (https://www.documentcloud.org/documents/2922623-H630-CSRI-32-v2-NEW-Coal-Ash-Bill-June-2016.html#document/p27/a305383) for closing intermediate-risk impoundments is August 1, 2028, and the deadline (https://www.documentcloud.org/documents/2922623-H630-CSRI-32-v2-NEW-Coal-Ash-Bill-June-2016.html#document/p27/a305380) for closing impoundments at plants with beneficiation processing is Dec. 31, 2029, both allowing for less time than the study's stated minimum timeframe

The lifespan of a thermal beneficiation plant is estimated to be 30 years.

No one seems to know how the deadlines in CAMA were determined. Duke Energy said to ask the legislators, but each legislator asked either didn't respond or suggested that another legislator be asked

"I can say that closure deadlines are one of the factors that we look at in determining where these units will ultimately be located," said Chatman "Sites with closure deadlines in the 2028-2029 time frame are better candidates for recycling since it allows you time to recycle a substantial amount of material, making the investment more cost competitive with other closure options."

Duke Energy estimates it has 158 million tons of coal ash stored in impoundments and landfills at the company's 14 North Carolina plants, with 124 million tons at its active plants At the rate of 900,000 tons per year, it would take 138 years to beneficiate its current inventory at active plants (assuming no waste ash, and not counting gypsum, which is also recycled from coal ash).

Despite lower ash production as the company's energy mix shifts more toward natural gas, the study predicts Duke Energy will continue to produce more than a million tons of ash annually for the foreseeable future.

Ash that is not beneficiated will be relegated to landfills or left in wet impoundments.

Ash quality matters

Southern bakers know that the wrong flour can ruin their biscuits. The same goes for concrete made with coal ash.

The market study states that thermal beneficiation processing "is a proven and highly flexible technology that can operate on a variety of ash types with a wide range of carbon concentration It produces an ash that is low or even free of carbon. It also eliminates ammonia from fly ashes impacted by nitrous oxide controls. In addition, the process also produces ash with improved fineness by liberating the very small particles that are trapped in the carbon particles"

Coal ash displaces Portland cement in the concrete mixture, and the ash makes for a more durable product Further, the creation of Portland cement is also a major contributor to greenhouse gas emissions. For those reasons, coal ash is now required to be used for many construction and transportation projects.

"In order to make concrete to meet specifications," Batten says, "we have to have it."

UPDATE:

Following publication, we received additional information from Jennifer McGinnis, Attorney and Principal Legislative Analyst for the N.C. General Assembly, as requested by Rep. Pricey Harrison. In essence, McGinnis said that due to confidentiality agreements she couldn't speak specifically to how the coal ash cleanup deadlines were established in North Carolina law, but that based on public feedback that "I think there was a desire to close the ponds, and eliminate associated risks, as quickly as possible." She also referenced the U.S. Environmental Protection's coal-ash regulation, which became effective in Oct. 2015

CORRECTION:

Henry Batten wishes to correct this quote: Batten reports that his company "consumes about 2.1 to 2.5 million tons of ash annually," writing via email: "The quote was referring to cubic yards of concrete at 2 5 million cyds We consume about 150,000 to 200,000 tons of ash annually."